resort to it in children. From a thorough trial I am convinced that it is just as useful in children as it is in adults.

Another group of cases in which massage is useful is in nervous children. Much can be accomplished by putting them to bed, carefully supervising the diet, and resorting to massage to keep up the nutrition. It is astonishing to see the improvement in a period of two weeks.

In cardiac lesions in children the result of acute rheumatism, the necessity of keeping these cases at rest for many weeks and months, in order to allow the heart muscle to regain its tone, is imperative. These patients will get up much stronger if after the febrile period has passed they are given massage, with first passive and then resisted movements.

Many other conditions might be mentioned where massage is useful, but in general the indications for its use are the same as in the adult, and the results are equally as good.

SOME HEMATOLOGICAL FINDINGS IN PELLAGRA.[1]

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Introduction. The material upon which the following report is based was obtained from cases of pellagra which were sent from the field headquarters of the Commission at Spartanburg, South Carolina, together with slide specimens of pellagrous blood taken from cases in South Carolina and forwarded for study to the New York Post-Graduate Medical School and Hospital during the summer and early fall months of 1912. In spite of the fact that the number of cases under consideration at that time was not large, nevertheless, it seemed advisable to record briefly the most important points in connection with the work that had already been done.

The blood was examined with a view of determining the hemoglobin content, the number of red and white cells per cubic millimeter, the differential leukocyte count, and at the same time the general morphologic characteristics of the blood in stained preparations. A few observations were also made on the coagulation time.

A review of the literature on this particular phase of the hematology of pellagra reveals an agreement of opinion in regard to the presence of a mild degree of secondary anemia of the chlorotic type without any marked structural or tinctorial alterations in the red corpuscles unless the anemia is pronounced. The majority of investigators state that the total leukocyte count varies, and that occasionally a leukocytosis exists which in most instances cannot be accounted for by the presence of a definite complication. The differential leukocyte count has apparently proved to be the most interesting and variable feature, and, judging from the available data, a fairly constant departure from the normal seems to be found in a large number of cases. Lavinder, in 1909, found "a relative large mononuclear increase with an absence of eosinophilia, except in cases with such complications as roundworms or hookworms." Sambon, working in Italy, also noticed a relative increase of the large mononuclear leukocytes. Contrary to these findings, Buhlig at the Peoria State Hospital, failed to demonstrate any increase in the large mononuclears. Bardin, quoted by Niles, found in uncomplicated cases of pellagra a lymphocytosis, with a corresponding reduction in polynuclears and a marked reduction in eosinophiles. Lavinder states that Fiorini, Gavini, and Masini in Italy found a decided eosinophilia. In the recent work of the Illinois Pellagra Commission no significant changes were observed in the differential leukocyte count.

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[1] This is the first of a series of reports of work performed under the auspices of the Thompson-McFadden Pellagra Commission of the Division of Tropical Medicine, Department of Laboratories, New York Post-Graduate Medical School and Hospital, ultimately to be issued as a complete volume by the Commission.

TECHNIQUE EMPLOYED. The blood was taken for examination in the midforenoon or midafternoon. The percentage of hemoglobin was estimated with the Sahli hemoglobinometer, two "readings" being made and the results averaged; this method was found quite satisfactory. The erythrocytes were counted with a Thoma-Zeiss apparatus, using a dilution of 1 to 200 and counting the corpuscles on the four corner "blocks" of twenty-five small squares in two drops. The average was then taken and the number of cells per cubic millimeter computed on this basis. In estimating the number of leukocytes a Zappert-Ewing chamber was used, thus affording an opportunity of counting 9 square millimeters in one drop. Two such determinations were made from a dilution of 1 to 20 in a "Rieder" pipet and the average taken; the usual calculation was then made. A difference of not more than twenty cells per field (high power) in the red count and eight cells per field (1 square millimeter, low power) in the white count was permissible. If a greater discrepancy existed a third drop was usually sufficient to rectify it, in either count.

For differential leukocyte counting films were made on clean, new slides, and a preparation selected in every case, on which the distribution of the corpuscles was moderately thin. Five hundred cells were counted over the midportion of each slide, care being taken not to encroach too closely on the ends, where frequently there is a relative increase in the more bulky leukocytes. The blood was stained with Wright's modification of Leishman's polychrome eosin-methylene blue mixture. The following classification was adopted: polynuclear neutrophiles, small lymphocytes, large lymphocytes, large mononuclears, transitionals, eosinophiles, and mast cells. Differentiation between the small and large lymphocytes was to a certain extent unsatisfactory, inasmuch as intermediate gradations in size were occasionally encountered. Mononuclear cells measuring 12 to 15 microns in diameter, and having a comparatively wide zone of protoplasm, were classified as large lymphocytes; these were generally found to contain round nuclei staining not quite so intensely as the nucleus of the small lymphocyte. The large mononuclear leukocyte was recognized by its size, being two to three times that of a red blood corpuscle and containing a pale oval nucleus, frequently eccentric in position; the protoplasm was usually abundant, and feebly basic. It was realized that distinction between these two cells is a matter of no little difficulty, and depends to a large extent upon the personal equation, which forms an important factor in this much-debated question in the cytology of the blood. The reason for attempting to classify these types separately arose from the desire to ascertain whether the so-called large mononuclear leukocyte exhibited any relative or absolute variation from normal limits.

The patients examined were divided into two groups, A and B. Under Group A were included those cases that were under observation in the hospital at the time the examinations were made. These patients received no medicine, and were allowed a liberal diet. In Group A the hemoglobin percentages were determined, the red and white cells counted, and differential leukocyte counts made; this series of investigations is designated as "complete blood counts." As will be seen in Table I, several such complete counts were made on most of the cases. Under Group B (Table II) are included those cases in which only differential leukocyte counts were done, it not being convenient to make a more detailed examination at the time.

ANALYSIS OF FINDINGS. In Table I the hemoglobin percentages show considerable variability, ranging from 58 to 107 per cent., with an average of 83 per cent. The erythrocytes are not markedly decreased, the lowest number being 3,920,000 per c. mm. As will be observed, several counts are 5,000,000 and over, the highest figure being 5,440,000. This occurred in the only male patient of the group, and was associated with a moderate reduction of the hemoglobin (65 per cent.). The patient was a poorly nourished individual, who was suffering from a mild attack of pellagra of about one year's duration. The majority of the members of this group appeared decidedly pale and anemic, according to general clinical criteria, and it was a matter of surprise to note the comparatively slight reduction in erythrocytes and hemoglobin that existed. The average red-cell count was 4,758,000 per c.mm.

TABLE I (GROUP A).—COMPLETE BLOOD COUNTS.

No.	Date.	Sex.	Age.	Hemoglobin. Per cent.	Erythrocytes.	Color index.	Leukocytes.	Differential leukocyte counts.														Stage of disease and clinical remarks.
								Polynuclears.		Small lymphocytes.		Large lymphocytes.		Large mononuclears		Transitionals.		Eosinophiles.		Mast cells.		
					Per c.mm.		Per c.mm.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	
	1912																					
1	June 4	F.	36	70	5,290,000	0.6	6,300	49.60	3125	40.00	2520	3.00	189	3.40	214	0.60	38	3.00	189	0.40	25	First attack, severe; duration, three weeks; watery diarrhea; strongyloides intestinalis numerous in stool.
	June 15			85	5,430,000	0.7	7,000	52.80	3696	27.20	1904	6.20	434	2.60	182	1.60	112	8.00	560	1.60	112	
	June 24			85	5,200,000	0.8	7,400	43.60	3227	40.00	2960	10.00	740	1.20	89	1.40	103	3.40	251	0.40	30	
	July 1			83	5,140,000	0.8	9,000	59.30	5337	24.60	2214	8.70	783	2.00	180	0.70	63	3.70	333	1.00	90	
	July 23			88	5,060,000	0.8	9,100	47.40	4313	42.00	3822	2.80	255	2.80	255	2.00	182	2.40	218	0.60	55	
2	June 4	F.	17	60	4,620,000	0.7	8,300	71.00	5893	18.00	1494	2.20	183	3.00	249	2.20	182	3.00	249	0.60	50	Recurrent attack, severe;[1] duration, three weeks.
	June 14			84	4,640,000	0.9	8,800	50.40	4435	33.40	2940	5.80	510	1.80	158	4.20	370	4.00	353	0.40	35	
	July 1			87	4,700,000	1.0	8,200	63.40	5199	21.20	1738	5.40	443	3.60	295	1.40	115	4.40	361	0.60	49	
3	June 4	M.	60	65	5,440,000	0.6	6,500	66.60	4329	24.00	1560	1.40	91	4.20	273	2.00	130	1.40	91	0.40	26	First attack, mild; duration, one year.
	June 12			98	5,040,000	1.0	7,100	55.80	3962	35.00	2485	1.60	114	4.40	312	1.40	99	1.60	114	0.20	14	
	June 19			95	5,000,000	0.9	8,000	55.00	4400	31.00	2480	6.75	540	2.00	160	1.00	80	3.75	300	0.50	40	
	June 25			93	4,900,000	0.9	7,200	62.00	4464	27.40	1972	4.80	346	2.00	144	0.80	58	2.60	187	0.40	29	
4	July 6	F.	40	105	4,000,000	1.3	8,000	41.15	3295	37.00	2960	13.35	1068	4.35	348	2.25	180	1.90	153	....	..	Recurrent attack, mild; duration, two and one-half months.
	July 16			100	4,560,000	1.0	7,200	55.00	3960	33.00	2376	2.20	159	4.20	303	1.60	115	3.60	259	0.40	29	
	July 27			102	5,100,000	1.0	10,000	45.50	4550	39.00	3900	8.20	820	5.50	550	1.30	130	....	...	0.50	50[2]	
5	July 6	F.	32	98	4,200,000	1.1	10,000	41.60	4160	42.30	4230	9.70	970	2.70	270	2.20	220	1.40	140	0.10	10	Recurrent attack, severe; duration, two months.
	July 16			102	4,250,000	1.2	8,000	50.20	4016	36.40	2912	5.40	432	3.20	256	0.40	32	4.40	352			
	July 27			107	4,400,000	1.2	11,000	56.50	6215	28.00	3080	6.50	715	5.00	550	1.00	110	3.00	330			
6	July 31	F.	18	88	4,800,000	0.9	9,000	69.00	6210	21.60	1944	4.40	396	1.80	162	1.40	126	1.80	162	....	..	First attack, mild; duration one month; no intestinal parasites found in stools.
	Aug. 8			86	5,000,000	0.8	14,000	60.20	8420	21.40	2996	5.60	784	3.40	476	1.40	196	7.80	1092	0.20	28	
7	July 31	F.	20	91	4,800,000	0.9	13,000	56.60	7358	37.20	4836	2.80	364	2.00	260	0.20	26	1.20	156			First attack, mild; duration, two weeks.
	Aug. 8			81	4,800,000	0.8	9,000	58.80	5292	32.00	2880	2.40	216	0.60	54	0.60	54	5.40	486	0.20	18	
8	July 17	F.	36	100	4,500,000	1.1	12,000	71.20	8544	15.00	1700	5.40	648	5.60	672	1.40	168	1.00	120	0.40	48	Recurrent attack, mild; duration, 3 weeks.
	Aug. 8			90	5,000,000	0.9	16,800	76.40	12835	16.20	2721	1.20	202	3.00	504	1.20	202	2.00	336			
9	Aug. 8	F.	28	78	4,800,000	0.8	10,000	60.00	6000	32.00	3200	3.00	300	1.00	100	1.00	100	3.00	300	....	..	Recurrent attack, severe; duration, 3 mos.
10	Aug. 4	F.	38	67	5,000,000	0.6	14,400	78.60	11318	17.20	2477	1.80	259	0.80	115	....	...	1.20	173	0.40	58	First attack, mild; duration, one month; chronic pulmonary tuberculosis.
	Aug. 17			70	4,320,000	0.8	11,000	66.25	7288	22.50	2475	2.50	275	1.00	110	4.50	495	2.50	275	0.75	82	
11	Sept. 7	F.	43	58	4,410,000	0.6	10,800	68.60	7409	26.60	2872	1.80	194	0.20	22	0.20	22	2.00	216	0.60	65	Recurrent attack, mild; duration, five months.
	Sept. 17			85	3,920,000	1.0	16,600	61.80	10358	32.00	5312	2.80	465	1.60	267	1.40	232	0.40	66			
12	Sept. 12	F.	34	65	5,400,000	0.6	18,000	72.60	13068	18.60	3348	3.20	576	1.00	180	2.40	432	2.20	396			Recurrent attack, mild; duration, four months.
	Sept. 24			100	4,380,000	1.1	9,100	61.30	5578	31.50	2866	3.50	319	1.30	118	1.50	109	0.80	73	....	..	
	Sept. 28			97	4,140,000	1.1	12,700	64.20	8143	26.40	3353	4.00	508	2.00	254	1.20	152	1.80	229	0.40	51	
	Average		33	83	4,758,000	0.8	10,403	59.13	4887	29.36	2828	4.63	440	2.50	252	1.50	144	2.73	203	0.34	31	

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[1] The term "severe" implies the presence of gastro-intestinal symptoms, nervous manifestations, and extensive skin lesions.

[2] Two hundred and twenty leukocytes counted.

TABLE II (GROUP B).—DIFFERENTIAL LEUKOCYTE COUNTS ONLY.

No.	Sex.	Age.	Polynuclears.	Small lymphocytes.	Large lymphocytes.	Large mononuclears.	Transitionals.	Eosinophiles.	Mast cells.	Stage of disease and clinical remarks.
1	M.	23	52.80	34.40	1.20	1.60	1.00	9.00	....	Recurrent attack, severe; duration, one month; stools not examined.
2	F.	34	59.20	32.00	2.40	2.40	2.00	2.00	....	First attack, severe; duration, one month.
3	F.	30	56.00	32.00	3.40	1.00	0.40	7.20	....	Recurrent attack, mild; duration, two months; stools not examined.
4	F.	19	56.00	33.40	1.80	2.00	1.80	5.00	....	First attack, mild; duration, one month; no intestinal parasites found in stools.
5	F.	40	66.00	28.00	4.00	1.00	....	1.00	....	First attack, mild; duration, two months.
6	F.	35	69.80	23.60	2.20	2.40	0.60	1.20	0.20	First attack, mild; duration, one month.
7	F.	26	49.20	39.00	4.00	1.40	1.60	3.40	1.40	Recurrent attack, mild; duration, two months.
8	F.	21	50.00	40.20	4.20	2.60	1.20	1.60	0.20	First attack, severe; duration, one month.
9	F.	30	60.60	32.80	2.80	2.60	0.40	0.80	....	First attack, severe; duration, two months.
10	F.	38	58.40	31.00	4.00	1.60	2.00	2.40	....	Recurrent attack, mild; duration, two months.
11	F.	38	56.80	31.00	2.40	2.80	2.00	4.00	0.40	Recurrent attack, mild; duration, four months.
12	F.	30	51.20	36.40	4.40	2.40	2.40	3.20	....	First attack, mild; duration, two months.
13	F.	35	61.00	30.60	4.40	2.40	1.00	0.60	....	First attack, mild; duration, two months.
14	F.	36	56.40	35.00	4.20	1.40	1.20	1.80	....	Recurrent attack, mild; duration, two months.
15	F.	27	34.80	50.40	5.20	4.80	0.40	2.80	1.00	Recurrent attack, mild; duration, five months; recovering.[4]
16	F.	44	37.80	40.40	10.00	4.80	0.40	5.60	1.00	Recurrent attack, mild; duration, one month.
17	F.	32	47.60	40.40	5.20	1.20	2.00	2.60	1.00	First attack, mild; duration, three months; recovering.
18	F.	36	62.60	26.00	3.00	0.20	0.40	7.80	....	Recurrent attack, mild; duration, four months; recovering; no intestinal parasites found in stools.
19	F.	28	68.00	21.80	3.40	2.00	1.00	3.80	....	Recurrent attack, severe; duration, five months.
20	M.	25	62.00	27.00	6.00	....	1.00	3.00	1.00	Recurrent attack, mild; duration, three months; recovering.
21	M.	36	57.00	31.00	5.00	0.50	1.50	5.00	....	Recurrent attack, mild; duration, six months.
22	F.	34	50.00	33.00	8.00	5.00	1.00	2.00	1.00	First attack, mild; duration, one month.
23	F.	19	55.00	38.00	4.00	1.00	0.20	1.00	0.80	Recurrent attack, mild; duration, three months; recovering.
24	M.	35	50.00	41.00	5.00	3.00	1.00	....	....	First attack, severe; duration, two months; recovering.
25	F.	32	64.00	23.00	7.00	1.00	....	4.00	1.00	First attack, mild; duration, four months.
26	F.	26	56.00	32.00	8.00	0.80	0.80	2.00	0.40	Recurrent attack, mild; duration, two months.
27	F.	40	60.00	30.00	7.00	2.00	....	1.00	....	First attack, mild; duration, three months.
28	M.	22	54.00	38.00	6.00	1.00	....	1.00	....	First attack, severe; duration, two months.
29	F.	48	63.00	25.00	8.00	....	1.00	3.00	....	Recurrent attack, severe; duration, three months
30	M.	39	54.60	32.40	5.20	1.20	0.60	6.00	....	First attack, mild; duration, five months; stools not examined.
31	F.	40	58.00	30.00	6.00	3.00	....	3.00	....	Recurrent attack, mild; duration, four months; recovering.
32	F.	34	60.00	27.00	8.00	3.00	....	2.00	....	First attack, mild; duration, two months.
33	F.	17	37.50	44.00	10.00	4.50	0.50	3.00	0.50	First attack, mild; duration, two months.
34	F.	38	73.60	20.00	3.20	1.00	1.00	1.20	....	First attack, severe; duration, four months.
35	F.	22	58.20	28.00	7.20	2.00	1.00	3.00	....	First attack, severe; duration, one month.
36	M.	58	60.20	26.20	9.40	2.00	....	2.20	....	First attack, severe; duration, five months.
37	M.	8	54.40	32.00	9.60	2.00	1.00	0.60	0.40	First attack, severe; duration, three months; recovering.
Average		29	56.00	32.37	5.28	1.98	0.87	2.94	0.26	

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[4] The term "recovering" means that the patient had no active signs or symptoms of pellagra when the blood was examined.

The color index was 1 or 1 plus in twelve determinations, the highest index being 1.3. In twenty instances it was under 1, the lowest being 0.6; the average index was 0.8. A careful examination of the stained blood films exhibited practically no changes in size, shape, or coloring of the red cells; nucleated corpuscles were never seen nor were there any staining variations from the normal, such as polychromatophilia and basophilic granulation. The average leukocyte count was 10,403 per c.mm., a trifle above the maximum normal. A slight or moderate leukocytosis existed in severe cases at some time during their residence in the hospital. No complications could be discovered in these patients. One patient with chronic pulmonary tuberculosis and much emaciation had a leukocytosis of 11,000 to 14,000; she had an irregular temperature, not exceeding 100.2° F. All the other cases were afebrile, and frequently had subnormal temperatures.

The differential leukocyte count revealed an absolute polynucleosis in those cases associated with a leukocytosis of over 10,000, except in one instance. Three of these cases, however, showed a slight relative decrease in the polynuclears. Out of thirty-two differential counts in this group, twenty-four gave a relative and, in addition, an absolute lymphocytosis, including under this term both small and large forms of lymphocytes. The average total lymphocytosis of the series was 33.99 per cent. The average large mononuclear count was 2.59 per cent. The highest percentage recorded was 5.5 per cent. The transitional forms average 1.5 per cent. These last two types taken together (Ehrlich's classification) form 1 to 6 per cent. of the leukocytes in normal blood; therefore, from the above figures it cannot be said that they show any constant alteration from the normal. The average eosinophile count of 2.73 per cent. is within normal limits. A few cases showed slight eosinophilia, the highest being 8 per cent. in which patient strongyloides intestinalis were found in the stools.

The coagulation time was determined in the first three cases with a Brodie-Russell coagulometer and was found to be six minutes and twenty seconds, four minutes and eight seconds, four minutes and twenty-five seconds, respectively, all of which readings are within the normal range for this instrument.

Table II. The differential leukocyte count on a series of slides taken from 37 cases at their homes in South Carolina was carefully determined without discovering any essential variation from the average results obtained in Group A. The average lymphocytosis of 37.65 per cent. is a little higher than in the previous group.

SUMMARY. From a consideration of the above data it is evident that there occasionally exists in pellagra a variable degree of chloranemia, which, however, is not a prominent feature of the attack. The disease, apparently, may be present for some time without leading to any anemic changes. Whether the anemia is due to the actual existence of pellagra, or is the result of an indefinite train of antecedent conditions extending over a period of time before the inception of the disease, is difficult to say. On the other hand, many cases are perfectly well up to the onset of the attack.

One of the most noteworthy features in connection with the leukocytes is the not infrequent presence of a leukocytosis, which appears to be inexplicable in the light of our present knowledge of the disease. This might suggest the possibility of an infectious etiology of obscure origin, or may be due to complicating disturbances. The lymphocytosis is interesting and is probably in accordance with the general cachectic condition of most pellagrins who are also often the subjects of gastro-intestinal disorders.

This investigation would seem to indicate that there are no characteristic or constant variations in the large mononuclear leukocytes and eosinophiles.

The writer wishes to thank Drs. P. S. Barrett, R. M. Brown, S. S. Irwin, and E. Kister, of the resident hospital staff, for assistance in making the blood examinations.

COMPLETE HEART-BLOCK, WITH RAPID IRREGULAR VENTRICULAR ACTIVITY.

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The following case of heart-block presents unique and unusual features which warrant its report:

History. L. W., aged twenty years; born in the United States; the oldest of three children; entered the surgical wards of the German Hospital February 20, 1912.[1] His family history presents nothing abnormal. He had an attack of scarlet fever and diphtheria about five years ago, from which he recovered entirely. Except for two mild attacks of gonorrhea, the last one occurring one year ago, he had been absolutely well until six months before admission. At that time he began to complain of indefinite abdominal symptoms. He had constipation, nausea, anorexia, and general abdominal pains, usually more marked on the right side; fever and night sweats. He lost about forty pounds in weight. There was occasionally a dry cough, but no expectoration. For two years he had been in the habit of counting his pulse, and he says that until his present illness it had always been between 70 and 80.

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[1] I am indebted to Dr. Willy Meyer and Dr. M. Rehling, Attending and Adjunct Surgeons to the German Hospital, New York, for permission to study and report this case.